CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No. CTCE/BBMP/W.No.03/GVG/CSR-02/1080f/QB(BC)/2015-16 16.03.2016

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer**, Yelahanka New Town Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. G. Venkategowda,** 13th A Cross Road, Yelahanka Upanagara, Bangalore – 64.
*NAME OF THE WORK	:	Developmental works new Vivekananda Park, Yelahanka 4th Phase & SFS 707 in Attur Ward No. 03, Yelahanka New Town Sub Division, BBMP, Bangalore.
REFERENCE	:	BBMP/AEE/YNSD/ /2015-16 Dated: 24.02.2016
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	14.03.2016
DATE OF TESTING	:	16.03.2016

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 °C, 1/10 mm	IS :1203 -1978 (RA-2009)	84	80 to 100
2	Softening point, °C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27°C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, °C	IS :1209 -1978 (RA-2009)	302	Min. 220

*Information is furnished by the Customer/Representative.

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Job No.: CTCE/BBMP/W.No.03/GVG/BC/AIV/2015-16 16.03.2016

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Mr. G. Venkategowda,** 13th A Cross Road, Yelahanka Upanagara, Bangalore – 64.
Name of the Work	Developmental works new Vivekananda Park, Yelahanka 4th Phase & SFS 707 in Attur Ward No. 03, Yelahanka New Town Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/YNSD/ /2015-16 Dated: 24.02.2016
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	16.03.2016

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	386	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	81	-
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	305	
4	Aggregate Impact value = percent fines			
	100* (W_2/W_1) percent	20.94	20.98	**20.96**

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Concrete is 24%

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Job No.: CTCE/BBMP/W.No.03/GVG/BC/Shape.T/2015-16 : 16.03.2016

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	: **Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	: **Mr. G. Venkategowda,** 13th A Cross Road, Yelahanka Upanagara, Bangalore – 64.
Name of Work	: Developmental works new Vivekananda Park, Yelahanka 4th Phase & SFS 707 in Attur Ward No. 03, Yelahanka New Town Sub Division, BBMP, Bangalore.
Reference	: BBMP/AEE/YNSD/ /2015-16 Dated: 24.02.2016
Technical Reference	: IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	: Bituminous Concrete
Date of Testing	: 16.03.2016

Result : Flakiness Index = **12.13%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index **26.03%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.03/GVG/BC/Stripping/2015-16 18.03.2016

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Mr. G. Venkategowda,** 13th A Cross Road, Yelahanka Upanagara, Bangalore – 64.
Name of the Work	Developmental works new Vivekananda Park, Yelahanka 4th Phase & SFS 707 in Attur Ward No. 03, Yelahanka New Town Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/YNSD/ /2015-16 Dated: 24.02.2016
Type of Mix	Bituminous Concrete
Date of Testing	18.03.2016

Type of binder : 80/100
Percentage of binder used : 5.00% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.00 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1		
2	3.2	3.20	96.80
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No 03/GVG/BC/Sp_Wa/2015-16 18.03.2016

Specific Gravity And Water Absorption Test
IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Mr. G. Venkategowda,** 13th A Cross Road, Yelahanka Upanagara, Bangalore – 64.
Name of the Work	Developmental works new Vivekananda Park, Yelahanka 4th Phase & SFS 707 in Attur Ward No. 03, Yelahanka New Town Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/YNSD/ /2015-16 Dated: 24.02.2016
Type of Mix	Bituminous Concrete
Date of Testing	18.03.2016

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	1998	1999	2000	
2	Weight of basket suspended in water	W_2 g	755	755	755	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_3$ g	1239	1238	1245	
4	Weight of saturated surface dry aggregate in air	W_3 g	2023	2024	2025	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_4)$ g	784	786	780	
6	Weight of oven dried aggregate	W_4 g	2010	2011	2013	
7	Specific Gravity	$W_4/(W_3-W_4)$	2.564	2.559	2.581	2.568
8	Apparent Specific gravity	$W_4/(W_4-W_4)$	2.607	2.602	2.621	2.610
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.65%	0.65%	0.60%	0.63%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.03/GVG/BC/Agg/2015-16 18.03.2016

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	**Mr. G. Venkategowda,** 13th A Cross Road, Yelahanka Upanagara, Bangalore – 64.
Name of theWork	Developmental works new Vivekananda Park, Yelahanka 4th Phase & SFS 707 in Attur Ward No. 03, Yelahanka New Town Sub Division, BBMP, Bangalore.
Reference	BBMP/AEE/YNSD/ /2015-16 Dated: 24.02.2016
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Bituminous Concrete
Date of Testing	18.03.2016

Total Weight of Sample: **5150** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	625	12.14	12.14	87.86	79 - 100	
9.5	460	8.93	21.07	78.93	70 - 88	
4.75	580	11.26	32.33	67.67	53 - 71	
2.36	600	11.65	43.98	56.02	42 - 58	
1.18	625	12.14	56.12	43.88	34 - 48	
0.600	530	10.29	66.41	33.59	26 - 38	
0.300	595	11.55	77.96	22.04	18 - 28	
0.150	430	8.35	86.31	13.69	12 - 20	
0.075	395	7.67	93.98	6.02	4 - 10	

Total Weight of Sample: **5250** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	JOBMIX Gradation as per MORTH	Remarks
19	0	0	0	100	100	Gradation satisfies Bituminous concrete Grade-II specification as per MORTH
13.2	635	12.10	12.10	87.90	79 - 100	
9.5	455	8.67	20.76	79.24	70 - 88	
4.75	590	11.24	32.00	68.00	53 - 71	
2.36	615	11.71	43.71	56.29	42 - 58	
1.18	635	12.10	55.81	44.19	34 - 48	
0.600	550	10.48	66.29	33.71	26 - 38	
0.300	590	11.24	77.52	22.48	18 - 28	
0.150	475	9.05	86.57	13.43	12 - 20	
0.075	415	7.90	94.48	5.52	4 - 10	

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Job No. CTCE/BBMP/W.No.03/GVG/BC/Stability/2015-16 18.03.2016

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Yelahanka New Town Sub Division, BBMP, Bangalore.
Agency	:	**Mr. G. Venkategowda,** 13th A Cross Road, Yelahanka Upanagara, Bangalore – 64.
Name of Work	:	Developmental works new Vivekananda Park, Yelahanka 4th Phase & SFS 707 in Attur Ward No. 03, Yelahanka New Town Sub Division, BBMP, Bangalore.
Reference	:	BBMP/AEE/YNSD/ /2015-16 Dated: 24.02.2016
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Bituminous Concrete
Date of Testing	:	18.03.2016

The results of the tests conducted on the bituminous concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-19)
1	Marshal Stability, Kn	9.15	9.15	9 Kn (min)
2	Marshal flow, mm	2.80	3.10	2 – 4
3	Percent air voids in Mineral Aggregate	3.70	3.85	3 – 6
4	Voids in Compacted Mix	13.10	13.30	13 – 15
5	Percent Voids filled with Bitumen	66.25	67.20	65 - 75
6	Density, g/cc	2.27	2.28	--

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